###extract the colours chosen for 'depressed' in Italian

depressed <- filter(Italy, FEELING == "depressed")

table.depressed <- table (depressed$Experimental.condition, depressed$COLOUR12)

table.depressed<- prop.table(table.depressed, 1)\*100

round(table.depressed, digits = 2)

chisq.test(table.depressed, simulate.p.value=TRUE)

depressed.resi <- round(chisq.test(table.depressed)$residuals,2)

model12 <- lmer(SATURATION ~ SEX + (1|FEELING) + (1|PARTICIPANT), data)

summary(model12)

r.squaredGLMM(model12)

plot12 <- ggplot(data, aes(x=SEX, y=SATURATION, fill = SEX)) +

geom\_boxplot() +

labs(x= "",y="Saturation") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(2, name = "GrandBudapest1"), name = "") +

theme(legend.position="none") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim (40, 100)

pred12 <- effect\_plot(model12, pred = SEX,

interval = TRUE,

x.label = "",

y.label = "Saturation (predicted)") + ylim (40, 100) + theme\_bham\_stats

library(gridExtra)

library(grid)

library(ggplot2)

library(lattice)

grid.arrange(plot11, plot12, ncol=2)

###RQ 3.3

model14 <- lmer(SATURATION ~ VALENCE\*SEX chi)

summary(model14)

r.squaredGLMM(model14)

effects.model14 <- data.frame(effect("VALENCE:SEX", model14))

plot14 <- ggplot(data = effects.model14, aes(x=VALENCE, y=fit, colour = SEX)) +

geom\_line(size=2) +

xlab("Valence") +

ylab("Saturation (predicted)") +

scale\_color\_manual(values = wes\_palette(2, name = "Darjeeling1", type = "continuous"), name = "")+

theme\_bham\_stats

### 3.5 (Brightness ~Arousal\*Gender) Are men or women more likely to associate more “intense” words with lighter colours (and more passive words with darker colours?)

model15 <- lmer(BRIGHTNESS ~ AROUSAL\*SEX chi)

summary(model15)

r.squaredGLMM(model15)

effects.model15 <- data.frame(effect("AROUSAL:SEX", model15))

plot15 <- ggplot(data = effects.model15, aes(x=AROUSAL, y=fit, colour = SEX)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

scale\_color\_manual(values = wes\_palette(2, name = "Darjeeling1", type = "continuous"), name = "")+

theme\_bham\_stats

model6 <- lmer(BRIGHTNESS ~ Experimental.condition + (1|FEELING) + (1|PARTICIPANT), Spain)

summary(model6)

r.squaredGLMM(model6)

model7 <- lmer(BRIGHTNESS ~ Experimental.condition + (1|FEELING) + (1|PARTICIPANT), Italy)

summary(model7)

r.squaredGLMM(model7)

model21 <- lmer(SATURATION ~ Experimental.condition + (1|FEELING) + (1|PARTICIPANT), Spain)

summary(model21)

r.squaredGLMM(model21)

model22 <- lmer(SATURATION ~ Experimental.condition + (1|FEELING) + (1|PARTICIPANT), Italy)

summary(model20)

r.squaredGLMM(model20)

####Explore the difference in the ways the feminine adjectives are rated:

data$Experimental.condition <- factor(data$Experimental.condition)

levels(data$Experimental.condition)

feminine <- filter (data, Experimental.condition == "feminine")

feminine$SEX <- factor(feminine$SEX)

levels(feminine$SEX)

model22.a <- lmer(SATURATION ~ COUNTRY\*SEX + (1|FEELING) + (1|PARTICIPANT), feminine)

summary(model22.a)

r.squaredGLMM(model20)

model19 <- lmer(BRIGHTNESS ~ Experimental.condition\*SEX + (1|FEELING) + (1|PARTICIPANT), data = Spain)

summary(model19)

r.squaredGLMM(model19)

model20<- lmer(BRIGHTNESS ~ Experimental.condition\*SEX + (1|FEELING) + (1|PARTICIPANT), data = Italy)

summary(model20)

r.squaredGLMM(model20)

plot19 <- ggplot(Spain, aes(x=Experimental.condition, y=BRIGHTNESS, fill = SEX)) +

geom\_boxplot() +

labs(x= "Experimental condition",y="Lightness",title = "Spain") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(2, name = "Darjeeling1"), name = "") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim (0, 100)

plot20<- ggplot(Italy, aes(x=Experimental.condition, y=BRIGHTNESS, fill = SEX)) +

geom\_boxplot() +

labs(x= "Experimental condition",y="Lightness", title = "Italy") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(2, name = "Darjeeling1"), name = "") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim (0, 100)

grid.arrange (plot19, plot20, ncol=2)

table.reason2 <- table(data$SEX, data$ANNOTATION2)

table.reason.prop2<- prop.table(table.reason2, 1)\*100

round(table.reason.prop2, digits = 2)

chisq.test(table.reason2, simulate.p.value=TRUE)

table.reason2.resi <- round(chisq.test(table.reason2)$residuals,2)

chisq.test(table.reason.cond, simulate.p.value=TRUE)

table.reason.cond.resi <- round(chisq.test(table.reason.cond)$residuals)

mosaic(~ ANNOTATION1 + Experimental.condition,

data = Spa.Ita,

shade = TRUE,

legend = TRUE,

xlab="Prompt",

ylab= "Motivations",

labeling\_args=list(rot\_labels=c(30, 30, 30, 30)),

offset\_varnames=1.2)

table.reason.cond2 <- table(Spa.Ita$Experimental.condition, Spa.Ita$ANNOTATION2)

table.reason.cond.prop2<- prop.table(table.reason.cond2, 1)\*100

round(table.reason.cond.prop2, digits = 0)

chisq.test(table.reason.cond2, simulate.p.value=TRUE)

table.reason.resi.2 <- round(chisq.test(table.reason.cond2)$residuals)

mosaic(~ ANNOTATION + Experimental.condition, data = data, shade = TRUE, legend = TRUE)

mosaic(~ ANNOTATION2 + Experimental.condition, data = data, shade = TRUE, legend = TRUE,

las = 1)

##lets visualise the residuals

packages = c('vcd', 'vcdExtra', 'tidyverse')

for(p in packages){

if(!require(p, character.only = T)){

install.packages(p)

}

library(p, character.only = T)

}

mosaic(~ ANNOTATION +SEX, data = data, shade = TRUE, legend = TRUE)

mosaic(~ ANNOTATION2 + SEX, data = data, shade = TRUE, legend = TRUE)

####\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

###extra stuff (not present in the book)

##(Saturation ~ Condition\*Sex)

model23 <- lmer(SATURATION ~ Experimental.condition\*SEX filter = Spain)

summary(model23)

r.squaredGLMM(model23)

model24<- lmer(SATURATION ~ Experimental.condition\*SEX filter = Italy)

summary(model24)

r.squaredGLMM(model24)

plot23 <- ggplot(Spain, aes(x=Experimental.condition, y=SATURATION, fill = SEX)) +

geom\_boxplot() +

labs(x= "Experimental condition",y="Saturation",title = "Spain") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(2, name = "Darjeeling1"), name = "") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim (0, 100)

plot24<- ggplot(Italy, aes(x=Experimental.condition, y=SATURATION, fill = SEX)) +

geom\_boxplot() +

labs(x= "Experimental condition",y="Saturation", title = "Italy") +

theme\_bham\_stats +

scale\_fill\_manual(values = wes\_palette(2, name = "Darjeeling1"), name = "") +

stat\_summary(fun=mean, geom="point", shape=23, size=5) + ylim (0, 100)

grid.arrange (plot23, plot24, ncol=2)

### 4.4 (Saturation ~ Valence\* Condition)

model27 <- lmer(SATURATION ~ VALENCE\*Experimental.condition filter = Spain)

summary(model27)

r.squaredGLMM(model27)

model28<- lmer(SATURATION ~ VALENCE\*Experimental.condition filter = Italy)

summary(model28)

r.squaredGLMM(model28)

effects.model27 <- data.frame(effect("VALENCE:Experimental.condition", model27))

plot27 <- ggplot(data = effects.model27, aes(x=VALENCE, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Valence") +

ylab("Saturation (predicted)") +

ggtitle("Spain") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

effects.model28 <- data.frame(effect("VALENCE:Experimental.condition", model28))

plot28 <- ggplot(data = effects.model28, aes(x=VALENCE, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Valence") +

ylab("Saturation (predicted)") +

ggtitle("Italy") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

grid.arrange (plot27, plot28, ncol=2)

### 4.5 (Brightness ~ Arousal\*Condition) Having seen that the more positive words are more likely to be associated with lighter colours (1.1), are there any differences depending on whether the feeling is shown in its feminine or masculine form?

model29 <- lmer(BRIGHTNESS ~ AROUSAL\*Experimental.condition filter = Spain)

summary(model29)

r.squaredGLMM(model29)

model30<- lmer(BRIGHTNESS ~ AROUSAL\*Experimental.condition filter = Italy)

summary(model30)

r.squaredGLMM(model30)

effects.model29 <- data.frame(effect("AROUSAL:Experimental.condition", model29))

plot29 <- ggplot(data = effects.model29, aes(x=AROUSAL, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

ggtitle("Spain") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

effects.model30 <- data.frame(effect("AROUSAL:Experimental.condition", model30))

plot30 <- ggplot(data = effects.model30, aes(x=AROUSAL, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

ggtitle("Italy") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

grid.arrange (plot29, plot30, ncol=2)

###let's explore the Italian results by looking at men and women separately:

Italy.female <- filter (Italy, SEX == "female")

Italy.male <- filter (Italy, SEX == "male")

model30.female<- lmer(BRIGHTNESS ~ AROUSAL\*Experimental.condition filter = Italy.female)

summary(model30.female)

r.squaredGLMM(model30.female)

model30.male<- lmer(BRIGHTNESS ~ AROUSAL\*Experimental.condition filter = Italy.male)

summary(model30.male)

r.squaredGLMM(model30.male)

effects.model30.female <- data.frame(effect("AROUSAL:Experimental.condition", model30.female))

plot30.female <- ggplot(data = effects.model30.female, aes(x=AROUSAL, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

ggtitle("Italian women") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

effects.model30.male <- data.frame(effect("AROUSAL:Experimental.condition", model30.male))

plot30.male <- ggplot(data = effects.model30.male, aes(x=AROUSAL, y=fit, colour = Experimental.condition)) +

geom\_line(size=2) +

xlab("Arousal") +

ylab("Brightness (predicted)") +

ggtitle("Italian men") +

scale\_color\_manual(values = wes\_palette(2, name = "FantasticFox1", type = "continuous"), name = "")+

theme\_bham\_stats

grid.arrange (plot30.female, plot30.male, ncol=2)

###Fig 6.7. by experimental condition (masculine and feminine feelings)

model1.exp.spain <- lmer(BRIGHTNESS ~ VALENCY \* EXPERIMENTAL filter = Spain)

summary(model1.exp.spain)

r.squaredGLMM(model1.exp.spain)

library(lme4)

library(MuMIn)

model1.exp.italy <- lmer(BRIGHTNESS ~ VALENCY \* Experimental.condition filter = Italy)

summary(model1.exp.italy)

r.squaredGLMM(model1.exp.italy)

plot1.exp.spain <- plot\_model(model1.exp.spain, type = "int", title = "Spain", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Valency", y="Brightness (predicted)") + theme\_bham\_stats

plot1.exp.italy <- plot\_model(model1.exp.italy, type = "int", title = "Italy", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Valency", y="Brightness (predicted)") + theme\_bham\_stats

grid.arrange(plot1.exp.italy, plot1.exp.spain, ncol=2)

model2.exp.spain <- lmer(SATURATION ~ AROUSAL \* EXPERIMENTAL + (1|FEELING) + (1|PARTICIPANT), data = Spain)

summary(model2.exp.spain)

r.squaredGLMM(model2.exp.spain)

model2.exp.italy <- lmer(SATURATION ~ AROUSAL \* EXPERIMENTAL + (1|FEELING) + (1|PARTICIPANT), data = Italy)

summary(model2.exp.italy)

r.squaredGLMM(model2.exp.italy)

plot2.exp.spain <- plot\_model(model2.exp.spain, type = "int", title = "Spain", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Arousal", y="Saturation (predicted)") + theme\_bham\_stats

plot2.exp.italy <- plot\_model(model2.exp.italy, type = "int", title = "Italy", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Arousal", y="Saturation (predicted)") + theme\_bham\_stats

grid.arrange(plot2.exp.italy, plot2.exp.spain, ncol=2)

model3.exp.spain <- lmer(SATURATION ~ VALENCY \* EXPERIMENTAL + (1|FEELING) + (1|PARTICIPANT), data = Spain)

summary(model3.exp.spain)

r.squaredGLMM(model3.exp.spain)

model3.exp.italy <- lmer(SATURATION ~ VALENCY \* EXPERIMENTAL + (1|FEELING) + (1|PARTICIPANT), data = Italy)

summary(model3.exp.italy)

r.squaredGLMM(model3.exp.italy)

plot3.exp.spain <- plot\_model(model3.exp.spain, type = "int", title = "Spain", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Valency", y="Saturation (predicted)") + theme\_bham\_stats

plot3.exp.italy <- plot\_model(model3.exp.italy, type = "int", title = "Italy", legend.title="Exp Cond") + ylim(0,100) + labs(x = "Valency", y="Saturation(predicted)") + theme\_bham\_stats

grid.arrange(plot3.exp.italy, plot3.exp.spain, ncol=2)

### case study 1: pink in men and women

###lets create subsets for women and men

library(dplyr)

str(data)

women <- filter(data, GENDER == "female")

men <- filter(data, GENDER == "male")

### case study 1: pink in men and women

### now create a new subset for pink

women.pink <- filter(women, COLOUR1 == "pink")

men.pink <- filter(men, COLOUR1 == "pink")

###lets now plot residuals (with levelplot)

table <- table(women.pink$FEELING, women.pink$ANNOTATION\_SUB); table

chisq.test(table(women.pink$FEELING, women.pink$ANNOTATION\_SUB))

chisq.residuals=chisq.test(table)$residuals

colsteps=seq(min(chisq.residuals),max(chisq.residuals),length.out=100)

names(colsteps)=ifelse(colsteps>=4, "darkgreen", ifelse(colsteps>=2,"lightgreen", ifelse(colsteps<=-2, "red", "grey90")))

fig\_blue\_women <-levelplot(chisq.test(table)$residuals,

xlab="",

ylab="",

main = "Women & Pink",

scales=list(x=list(rot=45, cex=1.5), y=list(cex=1.5)),

col.regions=names(colsteps),

border="black")

table <- table(men.blue$FEELING, men.blue$ANNOTATION\_SUB); table

chisq.test(table(men.blue$FEELING, men.blue$ANNOTATION\_SUB))

chisq.residuals=chisq.test(table)$residuals

colsteps=seq(min(chisq.residuals),max(chisq.residuals),length.out=100)

names(colsteps)=ifelse(colsteps>=4, "darkgreen", ifelse(colsteps>=2,"lightgreen", ifelse(colsteps<=-2, "red", "grey90")))

fig\_blue\_men <-levelplot(chisq.test(table)$residuals,

xlab="",

ylab="",

main = "Men & Pink",

scales=list(x=list(rot=45, cex=1.5), y=list(cex=1.5)),

col.regions=names(colsteps),

border="black")

### case study 2: blue in men and women

### now create a new subset for pink

women.blue <- filter(women, COLOUR1 == "blue")

men.blue <- filter(men, COLOUR1 == "blue")

###lets now plot residuals (with levelplot)

table <- table(women.blue$FEELING, women.blue$ANNOTATION\_SUB); table

chisq.test(table(women.blue$FEELING, women.blue$ANNOTATION\_SUB))

chisq.residuals=chisq.test(table)$residuals

colsteps=seq(min(chisq.residuals),max(chisq.residuals),length.out=100)

names(colsteps)=ifelse(colsteps>=4, "darkgreen", ifelse(colsteps>=2,"lightgreen", ifelse(colsteps<=-2, "red", "grey90")))

fig\_blue\_women <-levelplot(chisq.test(table)$residuals,

xlab="",

ylab="",

main = "Women & Blue",

scales=list(x=list(rot=45, cex=1.5), y=list(cex=1.5)),

col.regions=names(colsteps),

border="black")

table <- table(men.blue$FEELING, men.blue$ANNOTATION\_SUB); table

chisq.test(table(men.blue$FEELING, men.blue$ANNOTATION\_SUB))

chisq.residuals=chisq.test(table)$residuals

colsteps=seq(min(chisq.residuals),max(chisq.residuals),length.out=100)

names(colsteps)=ifelse(colsteps>=4, "darkgreen", ifelse(colsteps>=2,"lightgreen", ifelse(colsteps<=-2, "red", "grey90")))

fig\_blue\_men <-levelplot(chisq.test(table)$residuals,

xlab="",

ylab="",

main = "Men & Blue",

scales=list(x=list(rot=45, cex=1.5), y=list(cex=1.5)),

col.regions=names(colsteps),

border="black")

###generate barplot

figx <- ggplot(data=tranq.calma, aes(x=COLOUR12, y=Freq, fill=NATIONALITY)) +

geom\_bar(stat="identity", color="black", position=position\_dodge()) +

geom\_text(aes(label=Freq), vjust=-1, color="black",

position = position\_dodge(0.9), size=3.5) +

labs(title="Colour choices for 'tranquila' and 'calma'",

x="Colours", y = "%") +

theme(legend.title = element\_blank()) +

scale\_fill\_manual(values=c("#c2a5cf", "#5ab4ac")) +

theme\_bham\_stats +

theme(axis.text.x = element\_text(angle = 45, hjust = 1)) +

theme(legend.title = element\_blank())